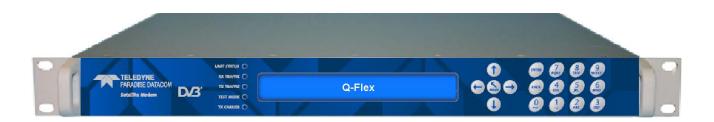


Q-FlexE[™] Dual IF/L-Band Satellite Modem With IP Encryption



OVERVIEW

The **Q-FlexE**[™] modem embodies a new concept in satellite modem technology - a *flexible software-defined modem* that does what you want, now and in the future.

The **Q-FlexE™** modem's *flexible hardware platform* provides IF and L-band operation in one unit, along with an advanced IP feature set that includes **AES-256 encryption**.

Flexible pricing is achieved by enabling only the features you need at any time. *Future-proofing* is assured by convenient software upgrades via Ethernet or a memory stick.

Advanced Bandwidth-Efficient Features

The **Q-FlexE[™]** modem supports the most powerful bandwidth-saving technology available.

Paired Carrier™ overlays transmit and receive carriers reducing satellite bandwidth by 50% (using ViaSat's patented PCMA technology).

Both DVB-S2, renowned for its robustness and bandwidth efficiency, and its successor, **DVB-S2X** are supported.

FastLink™ low-latency LDPC is optimised for latency-sensitive applications while giving coding gain that is close to the theoretical limits.

Bandwidth-saving IP features include acceleration and header and payload compression.

FEATURES

- Dual IF/L-band operation
- Data rates to 155Mbps
- XStream IPTM is an integrated suite of advanced IP optimization & traffic management features including TCP acceleration, header & payload compression, dynamic routing, traffic shaping, encryption & ACM
- ▶ DVB-S2X, FastLink™ LDPC & TPC
- Terrestrial interfaces include Ethernet & optical Ethernet, EIA-530, G.703, ASI, OC-3 & STM-1
- Optimized spectral roll-offs, including 5%
- ▶ Paired Carrier[™] carrier overlay
- ► LinkGuard[™] signal-under-carrier interference detection
- Built-in spectrum & constellation monitors
- New! DVB-S2X!
- New! DVB Carrier ID! Fully compliant with DVB-CID standard!
- New! Secure AAA RADIUS login using your normal company network login credentials!

Applications

- IP trunking and IP backhaul
- Corporate networking
- Mobile/G.703 backhaul
- Disaster recovery
- Maritime communications
- Satellite news gathering
- High-speed trains

Request A Quote

Q-FlexE[™]

Dual IF/L-Band Satellite Modem

Main Spec	Main Specifications					
Frequency	IF: 50 to 90MHz & 100 to 180MHz (resolution 100Hz) (BNC connector) L-band: 950 to 2050MHz (resolution 100Hz) (N-type connector) L-band option: Extends L-band opera- tion to 2150MHz					
Data Rate	Operation to 2,048kbps provided as standard Extension options: 5Mbps, 10Mbps, 25Mbps, 60Mbps, 100Mbps and 155.52Mbps					
Data Rate Limits	DVB-S2X: 100kbps to 155.52Mbps DVB-S2: 350kbps to 132Mbps FastLink TM LDPC: 18kbps to 100Mbps TPC: 4.8kbps to 60Mbps 1bps resolution					
Symbol Rate Limits	DVB-S2X: 100ksps to 50Msps DVB-S2: 350ksps to 37.5Msps FastLink [™] LDPC: 18ksps to 40Msps TPC: 9ksps to 40Msps					
Operating Modes	DVB-S2X (EN 302 307-2) option DVB-S2 (EN 302 307-1) option Closed Network (+ ESC) (IESS-315) IBS/IDR (IESS-308/309/310/314) options					
Scrambling	DVB-S2/DVB-S2X: As per EN 302 307 IBS: As per IESS-309 Closed Network + ESC: Synchronised to ESC overhead					
Impedance	IF : 50Ω/75Ω L-band : 50Ω					
Return Loss	IF: 18dB typical L-band: 14dB typical					
Redundancy	1:1 or up to 1:16 redundancy					

Traffic Interfaces

Base modem (standard): Gigabit Ethernet (single RJ45) for IP traffic Traffic options: 4-port Gigabit Ethernet switch (extends base modem Ethernet traffic port with another 3 Ethernet ports, creating 4-port switch) Optical Gigabit Ethernet/STM-1/OC-3 (Small Form-Factor pluggable module) EIA-530 (RS422, X.21, V.35 and RS232 on 25-pin EIA-530 (RS422, X.21, V.35 and RS232 on 25-pin D-type female) G.703 E1/T1, E2/T2, E3/T3 (balanced on RJ45; unbalanced 75Ω BNC female) Quad E1 G.703 (balanced RJ45) Quad ASI (75Ω BNC female) Serial LVDS (25-pin D-type female) HSSI (50-pin HD SCSI-2 connector) IDR (to IESS 308; 50-way female D type connector) **Modulator**

modulator	
Output Power	IF: 0 to -25dBm (0.1dB steps) L-band: 0 to -40dBm (0.1dB steps)
Output Power Stability/Accuracy	Stability: ±0.5dB, 0°C to 50°C Accuracy: ±0.375dBm
Transmit Filter Roll-off	5%, 10%, 15%, 20%, 25%, 35%
Phase Accuracy	±2° maximum
Amplitude Accuracy	±0.2dB maximum
Carrier Suppression	-30dBc minimum
Output Phase Noise	As EN 302 307 and IESS-316, nominally 3dB better
Harmonics	Better than –55dBc/ 4kHz in band (at 0dBm to –30dBm output)
Spurious	Better than –55dBc/ 4kHz in band (at 0dBm to –30dBm output)
Transmit On/Off Ratio	55dB minimum
BUC PSU Option	24V or 48V DC via IFL cable, 200W
BUC 10MHz Reference	Via IFL cable; 10MHz ± 0.001 ppm; 3dBm ± 3dB
FSK Control	Allows monitor & control of a compat- ible L-band BUC from the modem via the Tx IFL cable

Demodulator Input Range IF minimum: -130 + 10 log (symbol rate) IF/L-band maximum: -80 + 10 log (symbol rate) Maximum Composite +104Bm Wanted-to- composite IF: -94 + 10 log (symbol rate) Frequency Up to 10Msps: ±1kHz to ±32kHz (1kHz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100pm minimum att 00m sat 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) LNB 10MHz Keferenc 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Keferenc QPSK 114, 113, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 DVB-S2X QPSK 114, 113, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 Portor DVB-S2 28/65, 3/5, 2/43, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 DVB-S2X Varise, 23/36, 25/36, 13/18, 7/19, 7/39, 4/3, 5/6 DVB-S2X Varise, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 1/15, 7/9, 2/3 DVB-S2	dem	
-115 + 10 log (symbol rate) L-band minimum: -30 + 10 log (symbol rate) Maximum Composite +10 dBm Wanted-to- composite IF: -94 + 10 log (symbol rate) Vanted-to- composite IF: -94 + 10 log (symbol rate) Frequency Sweep Width Up to 10Msps: ±11klz to ±32kllz (1klz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK, at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Reference Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVS-S2 32/45 PSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 23/25 Jack 5, 5/8, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Jack 5, 5/8, 8/8, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 3/26, 28/5K 32/45 Jack 5, 5/8, 8/8, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 5/16, 8/9, 9/10, 23/26, 25/36, 6/3/18, 7/15, 8/15, 23/45 Jack 5, 5/2, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 3/24, 5/45, 8/24, 5/16, 8/9, 9/10, 32/45, 3/24, 5/11/5, 7/19, 4/25, 5/6, 13/18, 7/9, 7/79, 4/25, 5/6, 13/18, 7/9, 7/79, 4/	Demodulate	or
L-band minimum: -30 + 10 log (symbol rate) IF/L-band maximum: -80 + 10 log (symbol rate) Maximum Composite F: -94 + 10 log (symbol rate) Wanted-to- composite IF: -94 + 10 log (symbol rate) Frequency Sweep Width Up to 10Msps: ±1KHz to ±32KHz (1KHz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100ppm minimum Receive Filter Receive Filter 5%, 10%, 15%, 20%, 25%, 35% Roll-off AGC Output Buffered direct AGC output for antenna peaking LNB Voltage Selectable 130, 15V, 18V or 24V DC to LNB via IFL cable; 10MHz ± 0.001 ppm; 04Bm ± 3dB LNB Voltage QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 DVB-S2X QPSK 134, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 56, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 DVB-S2X QPSK 13/4, 1/3, 2/5, 1/4, 8/15, 3/45, 32/45, 3/2, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/3, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/3, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/5, 5/6 DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/		IF minimum:
-130 + 10 log (symbol rate) IF/L-band maximum: -80 + 10 log (symbol rate) Wanted-to- composite IF: -94 + 10 log (symbol rate) Vanted-to- composite IF: -94 + 10 log (symbol rate) Frequency Up to 10Msps: ±1kHz to ±32kHz (1kHz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13N, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X port for DVB-S2 32/45 abs yout 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 abs upport 23/26, 23/36, 13/18, 7/15, 8/15, 8/25, 32/45 bVB-S2X Vers S2X 106, 5/6, 8/9, 9/10, 32/45, 31/17, 7/19, 2/3 bVB-S2X Vers S2X 104, 4/5, 5/6, 8/9, 9/10, 32/45, 3/2, 4/4, 5/5, 6/8, 9/9, 9/10, 32/45, 3/2, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 GPSK K14A, 1/3, 2/5, 1/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 bVB-S2X Vers S2X tow Fratadise proprietary CPSK/BPSK16APSK/32/		
-80 + 10 log (symbol rate) Maximum Composite +10dBm Wanted-to- composite IF: -94 + 10 log (symbol rate) Frequency L-band: -102 + 10 log (symbol rate) Frequency Uht2 steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range 5%, 10%, 15%, 20%, 25%, 35% Roceive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; Reference OdBm ± 3dB Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A DVB-S2X OPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 DVB-S2X OPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 13/18, 7/9, 770, 7/15, 8/15, 32/45 of DVB-S2 are shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/5, 5/6 DVB-S2X Low- tatency Mode Very Short Frame; (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) PSKABSK 11/15, 7/9, 4/5, 5/6 Very Short Frame; (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) <tr< td=""><td></td><td>-130 + 10 log (symbol rate)</td></tr<>		-130 + 10 log (symbol rate)
Maximum Composite +10dBm Wanted-to- composite IF: 94 + 10 log (symbol rate) Frequency Up to 10Msps: ±10kHz to ±32kHz Sweep Width UkHz steps) Above 10Msps: ±10kHz to ±250kHz (10kHz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kDps, less than 1s at 6dB Es/No QPSK, at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range #100ppm minimum Range ±100ppm minimum Raceive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; Reference 0dBm ± 3dB Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Port for DVB-S2 Port for DVB-S2X QPSK 114, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 22/45, 32/45 Rates support- ed by DVB-S2X to for DVB-S22 are shown in italics SetAfs, 23/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 22/45 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 20% of standard DVB-S2 Short frame) PASX2 Very Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) GPSK/8PSK/16APSK/32APSK 1/3, 4/4, 5/6, 8/9, 9/10 <td></td> <td></td>		
Composite IF: -94 + 10 log (symbol rate) Composite L-banz: -102 + 10 log (symbol rate) Frequency Up to 10Msps: ±1kHz to ±32kHz (1kHz steps) Sweep Width Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK); at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X DVB-S2X 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 rof DVB-S2 af5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 rof DVB-S2X ref shown in italics 13/18, 7/9, 7/79, 7/15, 8/15, 32/45 af45, 5/6, 8/9, 9/10, 32/45, 32/45 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 32/45 PVB-S2X Low- latency Mode 5/4, 4/0, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 PAradise proprietary 7/15, 8/15, 3/2, 3/3, 4/4, 4/5, 5/6, 8/9, 9/10, 32/45, 5/16, 8/9, 9/10 PSK/8PSK/16APSK/223, 3/4, 4/5, 5/6, 8/9, 9/10	Maximum	
composite L-band: -102 + 10 log (symbol rate) Frequency Sweep Width Up to 10Msps: ±1kHz to ±32kHz (10kHz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X Jord SS2 QPSK 114, 173, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 20/45, 3/2, 24/5 DVB-S2X QPSK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 24/45, 3/2, 24/45, 23/36, 25/36, 13/18, 7/9, 7/90, 7/15, 8/15, 32/45 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/2, 7/9, 7/90, 7/15, 8/15, 3/2, 1/3, 3/4, 5/5 7/15, 8/15, 3/2	Composite	
Frequency Sweep Width Up to 10Msps: ±1kHz to ±32kHz (1kHz steps) Acquisition Time Dependent on FEC, data rate and sweep width (at 9.6kDs, less than 1s at 6dB Es/No QPSK); at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X Includes sup- port for DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 BYK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 32/45, 13/18, 7/15, 8/15, 32/45 BYK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 32/45, 13/18, 7/15, 8/15, 32/45 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) Paradise proprietary extension to DVB-S2X Very Short Frame: (Frame size of 5,200 bits, reducing latency to 20% of standard DVB-S2 Short frame) DVB-S2X Uitra Short Frame: (Frame size of 5,200 bits, reducing latency to 20% of standard DVB-S2 Short frame)		
Sweep Width (1kHz steps) Acouisition (1kHz steps) Acquisition Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range 100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB voltage Selectable 13V, 15V, 18V or 24V DC to LNB voltage DVB-S2X 0PSK 114, 113, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 20/245 Port for DVB-S2 at that are not part of DVB-S2 are shown in italics 0PSK 114, 173, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 22/26, 25/36, 13/18, 7/15, 8/15, 22/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 DVB-S2X Low- latency Mode 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 5/45, 23/36, 25/36, 25/36, 13/18, 7/9, 7/90, 7/15, 8/15, 32/45 Paradise proprietary VPS/SVL Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 13/15, 14/15 DVB-S24 0PSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 PAradise proprietary QPSK/16APSK/32APSK 2/5, 13/15, 14/15 DVB-S2 QPSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 <td></td> <td></td>		
Above 10Misps: ±10kHz to ±250kHz (10kHz steps) Acquisition Time Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK) Clock Tracking Range ±100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Porward Error Correction OPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45, 32/45 DVB-S2X MPSK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 23/45, 32/45,		
Acquisition TimeDependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK)Clock Tracking Range±100ppm minimum at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK; AGC OutputReceive Filter Roll-off5%, 10%, 15%, 20%, 25%, 35% antenna peakingLNB 10MHz ReferenceVia IFL cable; 10MHz ± 0.001 ppm; odBm ± 3dBLNB VoltageSelectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5ADVB-S2X Includes support- port for DVB-S2 that are not part of DVB-S2X respective shown in italics OPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/4 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 32/45 SPK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 5/36, 13/18, 7/15, 8/15, 26/45, 3/24, 5/36, 8/9, 9/10, 23/26, 5/36, 13/18, 7/15, 8/15, 26/45, 3/24, 50, 8/9, 9/10, 13/45, 9/20, 13/18, 7/9, 77/90, 7/15, 8/15, 3/24, 53/245 53/245 54/45, 3/3, 4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 4/5, 5/6DVB-S2X Low- latency ModeVery Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) Paradise proprietary extension to DVB-S2XDVB-S2 Low-Latency LDPCOPSK/0PSK 0.532, 0.639, 0.710, 0.778, 0.828, 0.886, 0.938, 0.940, 0.828, 0.886, 0.938, 0.940, 0.93 0PSK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10FastLink™ Low-Latency LDPCBPSK 5/16, 21/44, 3/4, 7/8, 0.93 16QAM 3/4, 7/8, 0.93 16QAM 3/4, 7/8, 0.93 16QAM		
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Clock Tracking Range ±100ppm minimum Receive Filter Roll-off 5%, 10%, 15%, 20%, 25%, 35% AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Reference 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X DVB-S2X OPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Pates support- ed by DVB-S2X OPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 10VB-S2 are shown in italics 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 2445, 3/245 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 22/45, 11/15, 7/9, 2/3 0DVB-S2 X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 3/4, 7/15, 2/15, 3/4, 4/5, 5/6, 8/9, 9/10 SPSK 3/4, 7/18, 0.93 DVB-S2 QPSK/AQAM 0.639, 0.710, 0.778 16APSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 0.532, 0.639, 0.710, 0.798 BPSK 5/16, 21/44, 3/4, 7/8		
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Roll-off AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Port for DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Pates support- ed by DVB-S22 that are not part of DVB-S2 are shown in italics GAPSK 1/4, 5, 5/6, 8/9, 9/10, 22/45, 3/2, 4/5, 5/36, 8/15, 32/2/5 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/5, 5/6 DVB-S2X Low- latency Mode Very Short Frame : (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/BPSK/16APSK/132APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 1/475 DVB-S2X textension to DVB-S2X Uitra Short Frame : (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ Low-Latency LDPC QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ Low-Latency LDPC QPSK 5/16, 21/44, 3/4, 7/8, 0.93 SPSK 3/2, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ Low-Latency LDPC QPSK 5/16, 21/44, 3/4, 7/8, 0.93		±100ppm minimum
AGC Output Buffered direct AGC output for antenna peaking LNB 10MHz Via IFL cable; 10MHz ± 0.001 ppm; 04Bm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Port for DVB-S2 QPSK 5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 Rates support- ed by DVB-S22 are shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 DVB-S2X Low- latency Mode 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 4/5, 5/6 DVB-S2X Low- latency Mode Very Short Frame : (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) <i>Paradise</i> proprietary extension to DVB-S2X Utra Short Frame : (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 QPSK/0QPSK 0.532, 0.639, 0.710, 0.788 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 0.778, 0.828, 0.886, 0.938, 0.860, 0.938 0.861 LDPC BPSK 0.778, 0.828, 0.886, 0.938, 0.800 S24PSK 0.778, 0.828, 0.886, 0.938, 0.800 0.93		5%, 10%, 15%, 20%, 25%, 35%
antenna peaking LNB 10MHz Reference Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X DVB-S2X QPSK 114, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Rates support- ed by DVB-S22 that are not part of DVB-S2 are shown in italics QPSK 13/8, 7/15, 8/15, 32/45 DVB-S2X tow- latency Mode Yery Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 0.499 QPSK/3PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK/0QPSK 0.532, 0.639, 0.710, 0.798 BPSK 0.499 QPSK/0QPSK 0.532, 0.639, 0.710, 0.798 Low-Latency LDPC BPSK 0.499 DVB-S2 BPSK 0.499 <		Buffered direct AGC output for
Reference 0dBm ± 3dB LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X QPSK 114, 113, 215, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Includes sup- port for DVB-S2 QPSK 13, 178, 7/15, 8/15, 32/45 BPSK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 atare not part of DVB-S2 are shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 22/45, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 DVB-S2X Utra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 114, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ Low-Latency LDPC BPSK 0.499 QPSK/0QPSK 0.532, 0.639, 0.710, 0.778 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44,		antenna peaking
LNB Voltage Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Pates support- ed by DVB-S2X QPSK 3/2, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 Pates support- ed by DVB-S2 are shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 DVB-S2 are shown in italics 26/45, 3/2, 5/8, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 IAPSK/0QPSK 0.532, 0.639, 0.710, 0.798 0.798 BPSK 0.499 QPSK/0QPSK 0.522, 0.639, 0.710, 0.798 DVB-S2 DVB-S2 DVB-S2 BPSK 5/16, 21/44, 3/4, 7/8, 0.93		
LNB via IFL cable; maximum 0.5A Forward Error Correction DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Pates suppor- ed by DVB-S2X BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 Pates suppor- ed by DVB-S2X 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 22/26, 25/36, 13/18, 7/15, 8/15, 32/45 of DVB-S2 are shown in italics 26/45, 3/2, 58/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 3/245 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) PARMise Utra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) DVB-S2 QPSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK/0DPSK 0.532, 0.639, 0.710, 0.798 BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 TAPSK/16QAM 0.639, 0.710, 0.778 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ BPSK 5/16, 21/44, 3/4, 7/8 0.93 Low-Latency LDPC BPSK 5/16, 21/44, 3/4, 7/8 0.9		
Forward Error Correction DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Bates support- ed by DVB-S2X BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 That are not part of DVB-S2 are shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 DVB-S2X Low- latency Mode 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 Paradise proprietary extension to DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, extension to DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 Ultra Short Frame; (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ Low-Latency LDPC BPSK 0.778, 0.828, 0.836, 0.938, 64QAM 0.828, 0.886, 0.93	LIND VOILage	
DVB-S2X QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Brsk 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 26/45, 32/45 32/45 Brsk 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 32/45 32/45, 26/45, 32/45 shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) Paradise proprietary extension to DVB-S2X Very Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ LDPC BPSK 0.778, 0.828, 0.838, 0.960 TFC BPSK 0.778, 0.828, 0.886, 0.938 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 0.93 0APSK/16QAM 0.726, 0.778, 0.828, 0.861, 0.93 0APSK/0QPSK 5/16, 21/44, 3/4, 7/8 0.93 0PSK-S/16QAM 0.726, 0.93		
4/5, 5/6, 8/9, 9/10, 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Port for DVB-S2 ed by DVB-S2X that are not part of DVB-S2 are shown in italics 398, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 26/45, 3/2, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 DVB-S2X tow- latency Mode 16APSK 21/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 Paradise proprietary extension to DVB-S2X Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 1/14, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 8PSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ LOPC BPSK 0.499 QPSK//0QPSK 0.532, 0.639, 0.710, 0.738 0.738, 0.886, 0.938, 0.960 TPC BPSK 0.778, 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 0.93 0PSK/0QPSK 5/16, 21/44, 3/4, 7/8 0.93 0.92 0PSK/0QPSK 5/16, 21/44, 3/4, 7/8 0.93		
Includes sup- port for DVB-S2 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 Rates support- ed by DVB-S2X 8PSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/26, 25/36, 13/18, 7/15, 8/15, 22/45, 32/45, 32/45 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 0 DVB-S2X Low- latency Mode 26/45, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 Paradise proprietary extension to Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ BPSK 0.499 Low-Latency LDPC QPSK/0QPSK 0.532, 0.639, 0.710, 0.778 BASK 0.499 QPSK/0QPSK 0.0778, 0.828, 0.8861 32APSK 0.778, 0.828, 0.886, 0.938	DVB-S2X	
port for DVB-S2 32/45 Rates support- ed by DVB-S2X that are not part 26/25/36, 13/18, 7/15, 8/15, 26/45, 32/45 that are not part 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 26/45, 3/5, 28/45, 23/36, 25/36, 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 DVB-S2 are shown in italics 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) Paradise proprietary extension to DVB-S2X Very Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/BPSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/BPSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 USB-S2 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 16APSK 2/3, 3/4, 5/6, 8/9, 9/10 FastLink™ BPSK 0.499 Low-Latency LDPC BPSK 0.499 DVB-S2 QPSK/0QPSK 0.532, 0.639, 0.710, 0.788 32APSK 0.778, 0.828, 0.886, 0.938 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8,	Includes sup-	
Rates support- ed by DVB-S2X 23/26, 25/36, 13/18, 7/15, 8/15, 26/45, 32/45 that are not part of DVB-S2 are shown in italics 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 7/790, 7/15, 8/15, 32/45 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 Paradise proprietary extension to DVB-S2X Very Short Frame: (Frame size of 3,240 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 DVB-S2X Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 11/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 8PSK/36QAM 0.639, 0.710, 0.778 LOPC QPSK/0QPSK 0.532, 0.639, 0.710, 0.798 BPSK 0.499 QPSK/0QPSK 0.532, 0.639, 0.710, 0.798 BPSK 0.778, 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8, 0.93 Others DVB-S: QPSK 1/2, 2/3, 3/4, 5/6 DVB-DSNG: 8PSK 2/3, 5/6, 8/9; 16QAM	port for DVB-S2	
ed by DVB-S2X that are not part of DVB-S2 are shown in italics 26/45, 32/45 13/B, 7/9, 77/90, 7/15, 8/15, 32/45 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 4/5, 5/6 DVB-S2X Low- latency Mode Paradise proprietary extension to DVB-S2X DVB-S2X Low- latency Mode Paradise proprietary extension to DVB-S2X DVB-S2X UItra Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 2/5, 13/15, 14/15 DVB-S2X UItra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK/0PSK 1/2, 3/4, 5/6, 8/9, 9/10 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ Low-Latency LDPC DVB-S2 QPSK/0QPSK 0.532, 0.639, 0.710, 0.778 16APSK 2/3, 0.886, 0.938 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8 <td>Rates support-</td> <td></td>	Rates support-	
of DVB-S2 are shown in italics 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 1atency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) Paradise proprietary extension to DVB-S2X 0PSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) DVB-S2 0PSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 0PSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FastLink™ BPSK 0,499 Low-Latency LDPC 0PSK/0QPSK 0.532, 0.639, 0.710, 0.798 BPSK 0,778, 0.828, 0.886, 0.938 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 0.93 3PSK 5/16, 21/44, 3/4, 7/8 0PSK/0QPSK 5/16, 21/44, 3/4, 7/8, 0.93 16QAM 3/4, 7/8, 0.93 Others 0VB-SS (2PSK 1/2, 3/4, 5/6, 8/9; 16QAM 3/4, 7/8 0VB-SNG: 8PSK 2/3, 5/6, 8/9; 16QAM 3/4, 7/8 0VB-SSNG: 8PSK 2/3, 5/6, 8/9; 16QAM 3/4, 7/8 <td>ed by DVB-S2X</td> <td>26/45, 32/45</td>	ed by DVB-S2X	26/45, 32/45
shown in italics 13/18, 7/9, 77/90, 7/15, 8/15, 32/45 32APSK 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 64APSK 11/15, 7/9, 2/3 DVB-S2X Low- latency Mode Very Short Frame: (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) Paradise proprietary extension to DVB-S2X QPSK/8PSK/16APSK/32APSK 2/5, 13/15, 14/15 Ultra Short Frame: (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9 DVB-S2 QPSK 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BPSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 8PSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 IAPSK /26APSK 0.532, 0.639, 0.710, 0.798 0.798 BPSK 0.499 QPSK/0QPSK 0.532, 0.639, 0.710, 0.778, 0.828, 0.886, 0.938, 0.851 32APSK 0.778, 0.828, 0.886, 0.938, 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 QPSK/0QPSK 5/16, 21/44, 3/4, 7/8 DVB-S2 DVB-S2 Others DVB-S1(2, 2/3, 3/4, 5/6 DVB-DSNG: 8PSK 2/3, 5/6, 8/9; 16QAM 3/4, 7/8 Others DVB-SNG: 8PSK 2/3 Sequential: BPSK/(O)QPSK 1/2, 3/4, 7/8 Reed-Solomon outer codec available		
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Low-Latency LDPC QPSK/0QPSK 0.532, 0.639, 0.710, 0.798 8PSK/8QAM 0.639, 0.710, 0.778 16APSK/16QAM 0.726, 0.778, 0.828, 0.851 32APSK 0.778, 0.828, 0.886, 0.938 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 0.93 BPSK 5/16, 21/44, 3/4, 7/8 0.93 Others DVB-S: QPSK 1/2, 2/3, 3/4, 5/6 DVB-DSNG: 8PSK 2/3, 5/6, 8/9; 16QAM 3/4, 7/8 Viterbi: BPSK/QPSK/0QPSK 1/2, 3/4, 7/8 1/2, 3/4, 7/8 Reed-Solomon outer codec available		16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
LDPC 0.798 8PSK/8QAM 0.639, 0.710, 0.778 16APSK/16QAM 0.726, 0.778, 0.828, 0.851 32APSK 0.778, 0.828, 0.886, 0.938 64QAM 0.828, 0.886, 0.938, 0.960 TPC BPSK 5/16, 21/44, 3/4, 7/8 QPSK/OQPSK 5/16, 21/44, 3/4, 7/8, 0.93 8PSK 3/4, 7/8, 0.93 Others DVB-S: QPSK 1/2, 2/3, 3/4, 5/6 DVB-DSNG: 8PSK 2/3, 5/6, 8/9; 16QAM 3/4, 7/8 Viterbi: BPSK/QPSK 1/2, 3/4, 7/8 Viterbi: BPSK/QPSK 1/2, 3/4, 7/8 TCM: 8PSK 2/3 Sequential: BPSK/(O)QPSK 1/2, 3/4, 7/8 Reed-Solomon outer codec available		
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DVB-DSNG: 8PSK 2/3, 5/6, 8/9; 16QAM 3/4, 7/8 Viterbi: BPSK/QPSK/OQPSK 1/2, 3/4, 7/8 TCM: 8PSK 2/3 Sequential: BPSK/(O)QPSK 1/2, 3/4, 7/8 Reed-Solomon outer codec available		
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Viterbi: BPSK/QPSK/OQPSK 1/2, 3/4, 7/8 TCM: 8PSK 2/3 Sequential: BPSK/(O)QPSK 1/2, 3/4, 7/8 Reed-Solomon outer codec available		
TCM: 8PSK 2/3 Sequential: BPSK/(O)QPSK 1/2, 3/4, 7/8 Reed-Solomon outer codec available		Viterbi: BPSK/QPSK/OQPSK 1/2, 3/4,
Sequential: BPSK/(O)QPSK 1/2, 3/4, 7/8 Reed-Solomon outer codec available		
Reed-Solomon outer codec available		Sequential: BPSK/(O)QPSK 1/2, 3/4,



TELEDYNE PARADISE DATACOM

	A Teledyne Technologies Company
Ethernet:	Standard Features
Bridging and Static Routing	Trunking mode: Hardware Layer 2 bridge supporting 155Mbps bi- directional traffic (at up to 500,000 packets per second); zero jitter
	Layer 2 bridge & Layer 3 router: Software processing capability of up to 150,000 packets per second
IPv4/IPv6	Dual IPV4/IPV6 TCP/IP supporting IPv4 and IPv6 bridging and routing
VLAN Support	IEEE 802.1q VLAN support IEEE 802.1p Quality of Service (packet prioritisation) using strict
DHCP, SNMP	priority or fair weighting queuing DHCP for automatic allocation of M&C IP address. SNMP v1, v2c & v3
Web Server	Modem web server M&C interface
IP Diagnostic	Shows Tx, Rx throughput (bps, pps);
Graphs TCP/IP	dropped, errored packet counts Generates & analyses TCP & UDP
Packet Generator/ Analyser	packet streams, allowing modem-to- modem IP testing without any other test equipment
Ethernet MTU Size	Standard: 10k bytes Optical Ethernet: 16k bytes
Ethernet:	XStream IP™ Option
and traffic mana mum reliability a	an integrated set of IP optimization agement features designed for maxi- and bandwidth efficiency. The maxi- t depends on features & traffic format
Traffic Shaping	Provides guaranteed throughput for priority traffic, using Committed and Burst Information Rates. Stream differentiation is by IP address, IEEE 802.1p priority, Diffserv DSCP, PID, VLAN ID or MPLS EXP
Header Compression	Robust Header Compression (RFC 3095). Reduces Ethernet/IP/UDP/ TCP/RTP header sizes typically by 90%. 1-way packet processing limit: 60,000 pps; 2-way limit: 45,000 pps. Includes Ethernet header compres- sion (compresses 14-byte Ethernet
Payload Compression	frame to typically one byte) Uses Deflate algorithm (RFC 1951) to compress TCP & UDP packets; typical payload compression of 50%
Dynamic Routing	RIP V1, V2; OSPF V2, V3; BGP V4
TCP Acceleration	Typical throughput level of 90% of link capacity. Supports 10,000 con- current accelerated TCP connections (plus at least 40,000 unaccelerated TCP connections) up to 100Mbps
AAA RADIUS Secure User Login	Authentication, Authorisation & Ac- counting. Greater access control & accountability. Replaces standard modem login with user's personal company network login credentials
AES-256 Encryption	Encrypts all IP traffic using AES with 256-bit keys
Ethernet:	XStream IP™ DVB-S2
	ndard as part of DVB-S2 & DVB-S2X
ACM	Dynamically varies modcod with varying link conditions, maximises throughput at all times by converting unused link margin into additional throughput; 100% link availability
VCM	Supports transmission/reception of two ASI streams or, one ASI stream with one IP stream, each with its own modcod for optimal throughput
IP-over- DVB Encapsulation	Supports the transmission of IP packets with/without Ethernet frames over DVB-S2; encapsulates & de- capsulates using MPE (EN 301 192), ULE (RFC 4326) or Paradise PXE

Q-FlexE[™]



Dual IF/L-Band Satellite Modem

Paired Carr	Paired Carrier [™] Option					
Paired Carrier™	Transmit and receive carriers are overlaid in the same space segment. Echo cancellation techniques are used to cancel the unwanted transmit carrier leaving the wanted receive carrier					
Paired Carrier™ data rate options (30kHz to 54MHz occu- pied bandwidth) Power asymmetry	256kbps, 512kbps, 1024kbps, 2.5Mbps, 5Mbps, 10Mbps, 15Mbps, 20Mbps, 25Mbps, 30Mbps, 40Mbps, 50Mbps, 60Mbps, 80Mbps, 100Mbps and 155Mbps traffic rate -10dB to +10dB					
Symbol rate asymmetry	Up to 12:1					
Eb/No degradation	Typically < 0.5dB (0.7dB for 16QAM/16APSK with 10dB power asymmetry; 1dB or more for 32APSK and higher)					
Mobile Operation	Uses GPS data to continually recalculate position relative to satellite, allowing uninterrupted operation in mobile environments anywhere in satellite footprint					
ClearLinQ™	Adaptive Tx Predistorter					

Option Corrects for linear & non-linear distortion in the RF chain (i.e. amplifier and transponder). Applicable to all FECs

and modulations (including DVB-S2X, DVB-S2, TPC & FastLink™). Maximises amplifier output power and minimises required back-off. Up to 2dB performance gain

DVB Carrier ID Option (ETSI TS 103 129)

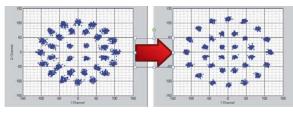
Supports the identification of interfering carriers. Allows identification of individual modem carriers by superimposing a low-power CID waveform onto the carrier with negligible degradation. The CID waveform contains a unique Carrier ID and other identity information. A carrier monitoring system is required to decode CID waveforms. The DVB Carrier ID option is available as a software upgrade for all Q-Series modems

TPC Performance

Eb/No (dB) at BER 5E-8								
	Rate 1/2	Rate 3/4	Rate 7/8	Rate 0.93				
BPSK, (O)QPSK	3.0	4.2	4.2	6.5				
8PSK		6.3	6.8	9.6				
16QAM		7.6	7.9	10.4				

DVB-S/DSNG Performance

Eb/No (dB) at QEF*								
	Rate 1/2	Rate 2/3	Rate 3/4	Rate 5/6	Rate 7/8	Rate 8/9		
QPSK	3.9	4.6	4.0	4.6	5.3			
8PSK		6.9		8.9		9.4		
160AM			9.0		10.7			



'Before and after' constellations showing ClearLinQ™ Adaptive Tx Pre-distorter compensating for severe non-linear signal distortion to a 32APSK carrier

	FastLi	nk™	Performa	ince		T
	Eb/No (dB) at I	BER 5E-8			В
			Low BER	Balanced	Low Latency	
	BPSK	0.499	2.1	2.9	3.4	
_	(O)QPSK	0.532	2.2	2.6	2.9	
	(O)QPSK	0.639	2.4	2.8	3.2	С
	(O)QPSK	0.710	2.7	3.3	3.7	m
	(O)QPSK	0.798	3.3	3.9	4.4	
	8PSK	0.639	5.9 (QEF*)	6.2 (QEF*)	6.7 (QEF*)	
_	8PSK	0.710	5.9 (QEF*)	5.5	5.9	A
	8PSK	0.778	5.7	6.1	6.6	
	8QAM	0.639	4.5	4.8	5.1	Ν
_	8QAM	0.710	5	5.4	5.7	S
	8QAM	0.778	5.6	5.9	6.3	
	16APSK	0.726	7.2 (QEF*)	7.7 (QEF*)	8.1 (QEF*)	۷
_	16APSK	0.778	7.4 (QEF*)	7.9 (QEF*)	8.3 (QEF*)	P
	16APSK	0.828	7.7	8.2	8.5	Ĭ
	16APSK	0.851	8	8.5	8.9	
	16QAM	0.726	7.6 (QEF*)	7.5	7.7	S
	16QAM	0.778	7	7.6	7.9	S
	16QAM	0.828	7.5	8.0	8.2	E
	16QAM	0.851	7.8	8.2	8.6	lr
	32APSK	0.778	9.4	9.9	10.3	C
	32APSK	0.828	10.1	10.7	11.2	Т
	32APSK	0.886	11.1	11.6	12.2	
	32APSK	0.938	12.9	13.5	14.3	Н

Test Facil	ities and Alarm Outputs
BER Tester	Bit error rate tester operates over main traffic, ESC or Aux channels, allowing BER monitoring while on traffic. Not available in DVB-S2 mode Supports various test patterns com- patible with common BER testers
Other test modes	Transmit CW (pure carrier) Transmit alternate 1-0 pattern Simulated satellite delay for TCP/IP packets
Alarm Relays	4 Independent Form C relays for unit, Tx, Rx and backward alarms
Mechanic	al/Environmental
Size	1U chassis, 410mm deep excluding front panel handles and rear panel connectors and fans
Weight	3.5kg
Power Supply	90 to 264VAC, 1A @100V, 0.5A @ 240V, 47 to 63Hz Fused IEC connector (live and neutral fused); 24V and 48V DC options
Compliances	FCC, CE and RoHS compliant
Safety Standards	EN60950-1:2006
Emissions and Immunity	Emissions: EN55022:2006 Class B Immunity: EN55024:1998 (+ A1:2001 + A2:2003
Operating Temperature	Standard: 0 to 50°C (storage: -40°C to 70°C) Extended: 0 to 55°C when fitted with Ruggedisation option
Humidity	95% relative humidity, non- condensing

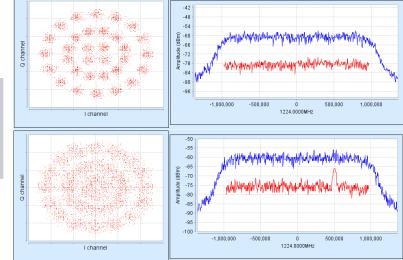
DVB-S2 Performance (for DVB-S2X performance, see separate datasheet) E

Eb/No (d	Eb/No (dB) for Normal (64k) frames at QEF* (Es/No in brackets)										
	Rate 1/4	Rate 1/3	Rate 2/5	Rate 1/2	Rate 3/5	Rate 2/3	Rate 3/4	Rate 4/5	Rate 5/6	Rate 8/9	Rate 9/10
QPSK	1.5 (-1.6)	1.1 (-0.7)	1.3 (0.3)	1.5 (1.5)	2.0 (2.8)	2.2 (3.4)	2.6 (4.3)	3.0 (5.0)	3.3 (5.5)	4.0 (6.5)	4.2 (6.7)
8PSK					3.8 (6.3)	4.1 (7.1)	4.9 (8.4)		5.8 (9.7)	6.8 (11.0)	7.0 (11.3)
16APSK						5.4 (9.6)	6.0 (10.7)	6.5 (11.5)	6.8 (12.0)	7.7 (13.2)	7.9 (13.4)

* Note: QEF is defined as a BER of 5E-12 (this is equivalent to a PER of approximately 5E-9).

In relation to FastLink[™], the QEF point is used for modcods where there is no discernible gradation in BER performance (i.e. once the demodulator has locked then the modem will operate at the QEF point only).

Note for operation with DVB-S2 Short (16k) frames, an Eb/No increase of 0.3dB is required (worst case) with respect to the corresponding modcod for Normal frame performance.



Built-in Spectrum Analyser showing LinkGuardTM Signal-Under-Carrier interference detection without/with interferer present.

Q-FlexE[™]



Dual IF/L-Band Satellite Modem

	Option	Description Fully configurable - pay only for what you need!
Base Modem	~	 4.8kbps to 2.048Mbps Closed Network (+ ESC) modem with two Ethernet 10/100/1000 BaseT RJ45s for M&C and traffic respectively; Ethernet bridge, static routing; IPv4/IPv6; IEEE 802.1p QoS; IEEE 802.1q VLAN; 10k bytes MTU IF operation 950 to 2050MHz; high-stability 10MHz reference; FSK TPC: BPSK, QPSK, QPSK, 8PSK and 16QAM; to 60Mbps subject to prevailing modem data rate LinkGuard[™]: Signal-under-carrier interference detection web spectrum graph showing received spectrum and any interference underneath the received carrier while on traffic; automated alarm when interference rises above user-set threshold; supported for FastLink[™], TPC and DVB-S2X for all modulations AUPC: Automatic Uplink Power Control Web browser monitoring tools: Spectrum display, constellation monitor, TCP/IP throughput Internal Bit Error Rate Tester (BERT): For non-DVB-S2/DVB-S2X operation only TCP/IP Packet Generator/Analyser: Generates and analyses TCP and UDP packet streams, allowing modem-to-modem IP testing without the need for any other test equipment
Tx-only		Transmit functions only
Rx-only		Receive functions only
Data Rate		5Mbps data rate: Extends base operation to 5Mbps
		10Mbps data rate: Extends 5Mbps operation to 10Mbps
		25Mbps data rate: Extends 10Mbps operation to 25Mbps
		60Mbps data rate: Extends 25Mbps operation to 60Mbps
		100Mbps data rate: Extends 60Mbps operation to 100Mbps (FastLink™, DVB-S2 & DVB-S2X only)
		155.52Mbps data rate: Extends 100Mbps operation to 155.52Mbps (DVB-S2 & DVB-S2X only)
XStream IP™		Traffic Shaping: Supports CIR/BIR/priority settings for IP streams classified by IP address, Diffserv class, IEEE 802.1p priority tag, MPLS EXP field, VLAN ID and MPEG2 transport stream PID
		Header Compression: IP/UDP/TCP/RTP packet header compression (RFC 3095) plus Ethernet header compression
		Payload Compression: TCP/UDP packet payload compression using the Deflate algorithm (RFC 1951)
		Dynamic Routing: RIP, OSPF and BGP
		TCP Acceleration: Up to 10,000 concurrent accelerated TCP connections to 100Mbps subject to prevailing data rate
		AAA RADIUS Secure User Login: Authentication, Authorisation & Accounting. Greater access control & accountability. Replaces standard modem login with user's personal company network login credentials
		Encryption: TCP/IP packet payload encryption using AES with 256-bit keys
XStream IP™ DVB -S2		IP-over-DVB Encapsulation: Encapsulation of IP packets and Ethernet frames over DVB-S2 using Paradise XStream Protocol (PXE), MPE or ULE
Provided as stand- ard as part of DVB-		ACM: DVB-S2/DVB-S2X ACM
S2 & DVB-S2X options		VCM: Allows either two ASI streams, or one ASI stream and one IP stream, to be multiplexed onto a single carrier; re- quires Quad ASI hardware option
DVB-S2X To 155Mbps sub- ject to prevailing		DVB-S2X CCM Tx: DVB-S2 QPSK, 8PSK, 16APSK & 32APSK Tx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 16APSK, 32APSK & 64APSK Tx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP [™] DVB-S2, which comprises ACM, VCM and IP-over-DVB encapsulation
modem data rate limits		DVB-S2X CCM Rx: Add-on card (P3609) supporting DVB-S2 QPSK, 8PSK, 16APSK & 32APSK Rx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 16APSK, 32APSK & 64APSK Rx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2, which comprises ACM, VCM and IP-over-DVB decapsulation
DVB-S2 Low-cost DVB-S2		DVB-S2 CCM Tx: DVB-S2 QPSK, 8PSK & 16APSK Tx operation per EN 302 307-1. Includes 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP [™] DVB-S2, which comprises ACM, VCM and IP-over-DVB encapsulation
option; to 155Mbps subject to modem data rate limits		DVB-S2 CCM Rx: Add-on card (P3604) supporting DVB-S2 QPSK, 8PSK & 16APSK Rx operation per EN 302 307-1. Includes 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP [™] DVB-S2, which comprises ACM, VCM and IP-over-DVB decapsulation. <i>Please note that this add-on card is physically different to the DVB-S2X add-on card</i> !
DVB-S2X Low- latency Mode Proprietary exten- sion to DVB-S2X		 Very Short Frame: Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame; supports QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 Ultra Short Frame: Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame; supports QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9
ClearLinQ [™] Adaptive Tx Predistorter		Corrects for linear & non-linear distortion in the RF chain. Applicable to all FECs and modulations including DVB-S2X, DVB-S2, FastLink™ & TPC
FastLink™ Low-latency LDPC		Add-on card (P3605); includes BPSK, QPSK, OQPSK, 8PSK, 8QAM, 16APSK, 16QAM, 32APSK & 64QAM; to 100Mbps subject to prevailing modem data rate limits



Configuration options continue on next page.

Q-FlexE[™] **Dual IF/L-Band Satellite Modem**



	Option	Description Fully configurable - pay only for what you need!
Paired Carrier™		Paired Carrier™ add-on card P3607 (requires one or more options below)
Subject to prevailing mo-		Paired Carrier™ up to 256kbps (requires Paired Carrier™ add-on card)
dem data rate limits.		Extends Paired Carrier™ up to 512kbps
Occupied bandwidth:		Extends Paired Carrier™ up to 1.024Mbps
minimum 30kHz; maxi-		Extends Paired Carrier™ up to 2.5Mbps
mum 54MHz		Extends Paired Carrier™ up to 5Mbps
		Extends Paired Carrier™ up to 10Mbps
		Extends Paired Carrier™ up to 15Mbps
		Extends Paired Carrier™ up to 20Mbps
		Extends Paired Carrier™ up to 25Mbps
		Extends Paired Carrier™ up to 30Mbps
Note that Paired Carrier™		Extends Paired Carrier™ up to 40Mbps
is also available as a low-		Extends Paired Carrier™ up to 50Mbps
cost 90-day per annum license for redundancy		Extends Paired Carrier™ up to 60Mbps
system standby modems		Extends Paired Carrier™ up to 80Mbps
 please contact Sales for details 		Extends Paired Carrier™ up to 100Mbps
		Extends Paired Carrier™ up to 155.52Mbps
Terrestrial Interfaces (Please choose up to four	-	4-port Gigabit Ethernet Switch: Extends base modem Ethernet traffic port with 3 Ethernet ports, creating 4-port switch
hardware options)		Optical Gigabit Ethernet/STM-1/OC-3: Small Form-factor Pluggable module; supports single-mode & multi-mode fibre & all wavelengths; supports all standard fibre connector types such as SC & LC (subject to provision of suitable mating socket for SFP cage)
		G.703: Provides unbalanced G.703 on 2xBNC 75Ω sockets and balanced G.703 on RJ45; includes G.703 clock extension, which provides a high-stability reference clock over satellite (alternative to GPS); includes Drop & Insert; supports E1, T1, E2, T2, E3 & T3
		EIA-530: D25 DCE supporting RS422/X.21/V.35/RS232
		Quad E1: Balanced G.703 on 4xRJ45; all four ports support Drop & Insert and are enabled as standard; IBS satellite framing enabled as standard; MultiMux enabled as standard, which allows IP and/or EIA530 traffic, if EIA530 interface fitted, in place of one or two Quad E1 ports (each MultiMux port is limited to 2.048Mbps traffic rate)
		Quad ASI: $4xBNC 75\Omega$ sockets; includes DVB-S/DSNG FEC (which can be used with all terrestrial interfaces)
		Serial LVDS: On 25-way D-type connector
		HSSI: On HD50 50-way SCSI-2 connector
		IDR: To IESS-308; 50-way female D-type connector; includes Advanced AUX (variable rate synchronous Aux channel; includes option to replace IDR audio channels with serial data); includes Audio option (for IBS carriers this allows 2 x audio in 64kbps or 2 x audio+64kbps data in 128kbps - requires IBS option)
Optimised Spectral Roll-off		Extends the standard 35%, 25% and 20% roll-off factors to include 5%, 10% and 15% roll-offs for FastLink™, TPC & legacy FECs including DVB-S
Ruggedisation		Ruggedises the modem for harsh environments (fans with higher airflow, heatsinks on key components, etc.)
Wideband		Extends L-band operation upper frequency limit from 2050MHz to 2150MHz
DVB-CID		DVB Carrier ID: Tx carrier identification per ETSI 103 129
Packet Synchronisation		Supports IEEE 1588 Precision Time Protocol Version 2
IBS		Satellite framing to IESS 309 with low-rate Intelsat ESC (to IESS 403) and high-rate IBS ESC
Legacy FEC		Sequential FEC (limited to 2.048Mbps); TCM 8PSK 2/3 to IESS 310; Viterbi BPSK/QPSK/OQPSK FEC rates 1/2, 3/4 & 7/8; Intelsat Reed-Solomon outer codec
24V DC Input		K3023 24V DC primary power input (in place of 100 to 240V AC input); DC input attaches via a screw-terminal connect- or plate
48V DC Input		K3018 48V DC primary power input (in place of 100 to 240V AC input); DC input attaches via a screw-terminal connect- or plate
24V 200W BUC PSU		P3543 AC input, 24V 200W DC to Tx BUC
48V 200W BUC PSU	L	P3544 AC input, 48V 200W DC to Tx BUC
48V In & 24V BUC PSU		P3545 Floating 48V DC input; +24V 200W DC to Tx BUC; DC input attaches via a screw-terminal connector plate
48V In & 48V BUC PSU		P3546 Floating 48V DC input; +48V 200W DC to Tx BUC; DC input attaches via a screw-terminal connector plate
+48V In & 48V BUC PSU		P3547 +48V DC input; +48V 200W DC to Tx BUC; DC input attaches via a screw-terminal connector plate

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